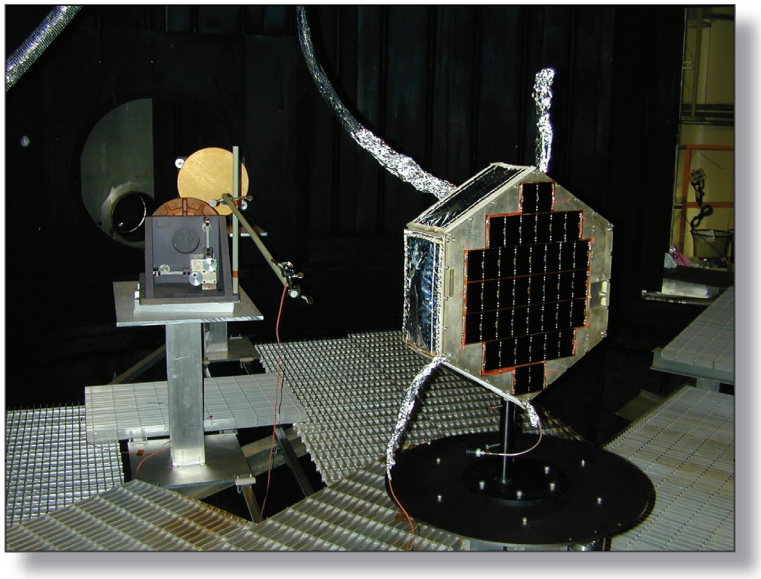
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

LHMEL SIMULATES SPACE ENVIRONMENT FOR ADVANCED MATERIALS AND SPACE SYSTEMS TESTING



The collaboration between the Materials and Manufacturing Directorate's Hardened Materials Branch and the Air Force Space Battlelab provides the Department of Defense (DoD) with the capability to test articles in a simulated space environment prior to launch and activation. The joint venture enabled the Laser Hardened Materials Evaluation Laboratory (LHMEL) to activate a highly capable, 27 ft tall, 20 ft diameter, cryogenically shrouded vacuum chamber.

The speed at which the chamber "pumps down" and the addition of a cryogenic and vacuum-compatible turntable, which is used to mount and rotate samples in the chamber without breaking the vacuum, allow researchers to conduct multiple experiments daily. The directorate values these research capabilities, used to simulate the high-vacuum, cryogenic temperature, and solar radiation effects of the space environment on materials and systems, at over $25 million.

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Accomplishment

A cooperative effort between the directorate and the Space Battlelab recently resulted in an upgrade of the LHMEL, a world-class material characterization facility. The directorate expanded the capability of the facility beyond laser effects testing to include large-scale, thermal testing and space environment simulation.

Background

Originally built by the Propulsion Laboratory, now the Propulsion Directorate, in the early 1960s, researchers used the vacuum chamber for space materials and systems qualification work. When the Space Battlelab, which operates under the direction of the Air Force Space Command, required a large-scale vacuum for testing a satellite, engineers at LHMEL began making the modifications required to make the chamber operational. The directorate's Hardened Materials Branch, which oversees LHMEL operations, and the Space Battlelab shared the cost of the modifications.

The LHMEL, a one-stop infrared testing resource, provides the Air Force with basic material response data, optical material characterization, hardening concept validation, and thermal simulation capabilities using a unique collection of laser wavelengths, power levels, and operating modes. LHMEL supports the directorate's mission to provide laser protection materials and hardening expertise for DoD personnel and systems.

The directorate's LHMEL offers nationally unique material testing and laser processing opportunities to accommodate a wide variety of testing. Operated by Anteon Corporation, LHMEL supports laser and space simulation testing for almost any user on a reimbursable basis, whether that user is a DoD organization, a government-sponsored contractor, or an industry-funded entity. In recent years, facility use has nearly doubled, increasing income and allowing the Air Force to maintain the multimillion dollar facility at a fraction of the annual operating cost and at a reduced economic burden to the Air Force.

Materials and Manufacturing
Emerging Technologies

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-ML-32)